PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-30-R-32

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2006 Survey Report

Champion Creek Reservoir

Prepared by:

C. Craig Bonds
and
Mandy K. Scott

Inland Fisheries Division
District 1-C, San Angelo, Texas

Robert L. Cook
Executive Director

Phil Durocher
Director, Inland Fisheries

July 31, 2007

TABLE OF CONTENTS

SURVEY AND MANAGEMENT SUMMARY

Fish populations in Champion Creek Reservoir were surveyed in 2006 using electrofisher and trap nets, and in 2007 using gill nets. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** Champion Creek Reservoir is a 1,560-acre impoundment at conservation pool (2,083 feet above MSL) and located 7 miles south of Colorado City in Mitchell County, Texas, in the Colorado River drainage basin. The reservoir is used for auxiliary water supply for the Texas Utilities (TXU) generation plant on Colorado City Reservoir, municipal water supply for Colorado City, and for recreation. The water level declined >50 feet from 1995 to 2003. The reservoir's water level has increased (>15 feet) since 2003 and surface acreage totaled 520 in May 2007. Habitat features consisted of rocks, nondescript shoreline, and flooded saltcedar. Access to the reservoir was restricted by a locked entrance gate. Gate keys could be procured by contacting the Colorado City municipal office. No boat ramps were usable, but boats could be launched off the shoreline.

- **Management History:** Important sport fish include largemouth bass, white crappie, and catfishes. The management plan from the 2002 survey report recommended waiting until the reservoir caught enough water to allow boat access before conducting evaluations of fish populations. A variety of fish species have been stocked in the reservoir including threadfin shad, channel catfish, and largemouth bass.

- **Fish Community**
  - **Prey species:** Threadfin shad continued to be present in the reservoir. Electrofishing catch of gizzard shad was moderately high, and approximately two thirds were available as prey to most sport fish. Electrofishing catch of bluegill was low, and most were less than 6 inches.

  - **Catfishes:** Channel catfish were stocked in the reservoir intermittently from 1967 to 1987 and again in 2005. Channel catfish were moderately abundant and exhibited a broad size structure. Flathead catfish were present in the reservoir.

  - **White bass:** White bass were low in abundance.

  - **Largemouth bass:** Florida largemouth bass were stocked in the 1980s and 1990s. An additional stocking was made in 2005 to take advantage of rising water levels and increased habitat. Largemouth bass were moderately abundant. Size structure continued to be poor with few fish present over 14 inches. Body condition and growth of largemouth bass was adequate.

  - **White crappie:** Abundance, size distribution, growth, and body condition of white crappie were good.

- **Management Strategies:** The reservoir should continue to be managed with statewide regulations. Conduct electrofishing surveys in 2008 and 2010. Conduct habitat, access, and trap netting surveys in 2010. Conduct gill netting survey in 2011.

INTRODUCTION

This document is a summary of fisheries data collected from Champion Creek Reservoir in 2006-2007. The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other species of fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data is presented with the 2006-2007 data for comparison.

Reservoir Description

Champion Creek Reservoir is a 1,560-acre impoundment constructed in 1959. Located in Mitchell County, approximately 7 miles south of Colorado City, the reservoir is operated and controlled by Texas Utilities (TXU). The reservoir is used for auxiliary water supply for the TXU generation plant on Colorado City Reservoir, municipal water supply for Colorado City, and for recreation. The TXU generation plant on Colorado City Reservoir ceased operation circa 2003, ending the need for auxiliary water from Champion Creek Reservoir. The water level declined >50 feet from 1995 to 2003. The reservoir's water level has increased (>15 feet) since 2003 and surface acreage totalled 520 in May 2007. Habitat features consisted of rocks, nondescript shoreline, and flooded saltcedar. Access to the reservoir was restricted by a locked entrance gate. Gate keys could be procured for public use by contacting the Colorado City municipal office. No boat ramps were usable, but boats could be launched off the shoreline. Other descriptive characteristics for Champion Creek Reservoir are in Table 1.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Van Zee 2003) included:

1. Wait until water levels rise sufficiently to allow boat access to the reservoir; at which time, conduct an evaluation of fish populations.

   Actions: Fish populations were surveyed with electrofishing in 2004 and 2006, trap netting in 2006, and gill netting in 2007. Channel catfish and Florida largemouth bass were stocked in 2005.

Harvest regulation history: Sportfishes in Champion Creek Reservoir are currently and have historically been managed with statewide regulations (Table 2). One exception was a 16-inch minimum length limit (MLL) imposed on largemouth bass in 1995 to protect a strong year class produced following a 10-foot water rise in 1994. Declining water level following the regulation change negated benefits of the previous water rise and the size limit was rescinded in favor of the statewide 14-inch MLL in 1999 (Dennis and Farquhar 2000).

Stocking history: Threadfin shad were stocked in 1982 and 1984. Channel catfish were stocked multiple times in the 1960s – 1980s and again in 2005. Florida largemouth bass were intermittently stocked in the 1980s and 1990s and again in 2005. The complete stocking history is in Table 3.

Vegetation/habitat history: Champion Creek Reservoir has not supported aquatic vegetation due to severe water level fluctuations. Shoreline habitat consisted mainly of flooded saltcedar, rocks, and nondescript shoreline (Table 4).

METHODS

Fishes were collected by electrofishing (1.0 hour at 12, 5-min stations), gill netting (5 net nights at 5 stations), and trap netting (5 net nights at 5 stations). Additional electrofishing (0.1 hour at 1, 5-min station

plus 0.7 hour of pedal time at biologist-selected stations) was conducted to collect largemouth bass for genetic and age sampling. Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing and, for gill and trap nets, as the number of fish per net night (fish/nn). Data collected from the additional 5-minute electrofishing station was included in the CPUE and size structure estimates for largemouth bass only as this species was targeted solely. Largemouth bass collected at biologist selected stations (0.7 hour total) were not included in CPUE and size structure estimates. All other survey sites were randomly selected and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2005). Microsatellite DNA analysis was used to determine largemouth bass genetic composition. Prior to 2005, genetic analysis was done by electrophoresis.

Sampling statistics (CPUE for various length categories), structural indices [Proportional Stock Density (PSD), Relative Stock Density (RSD)], and condition indices [relative weight (W_r)] were calculated for target fishes according to Anderson and Neumann (1996). Index of vulnerability (IOV) was calculated for gizzard shad (DiCenzo et al. 1996). Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE statistics. Ages were determined using otoliths for largemouth bass and white crappie. We collected 8 largemouth bass (13.0 and 14.9 inches) and 14 white crappie (9.5 and 10.5 inches) for aging. Source for water level data was the United States Geological Survey website.

RESULTS AND DISCUSSION

Habitat: Champion Creek Reservoir supported no aquatic vegetation species. Much (80%) of the reservoir's shoreline has been invaded by non-native saltcedar. Most of the saltcedar appeared dead during the 2007 habitat survey. Other habitat features included rocks and nondescript shoreline.

Prey species: Threadfin shad were present in 2006 (46.0/h). Electrofishing catch rates of gizzard shad and bluegill were 365.0/h and 36.0/h, respectively. Total CPUE of gizzard shad was lower compared to 1999 and 2004, and IOV (percentage of shad <8 inches) was lower compared to 2004 (Figure 2). Total CPUE of bluegill in 2006 was lower than 2004, but similar to 1999 (Figure 3). Bluegill size structure has steadily improved since 1999 (Figure 3).

Channel catfish: Channel catfish were stocked in multiple years from 1967 through 1987. They were stocked in 2005 to take advantage of increased water level and habitat. The gill net catch rate (5.8/nn) of channel catfish in 2006 was higher compared to 1997 (3.6/nn) (Figure 4). Size structure was good with fish ranging from 8 to 25 inches. W_r values were generally above 90.

Flathead catfish: Flathead catfish were present in low (1.0/nn) numbers. Fish collected in the 2007 gill netting survey ranged in size from 22 to 24 inches. W_r values were between 90 and 110.

White bass: The gill net catch rate of white bass was 0.4/nn in 2007 which was lower than in 1999 (4.0/nn) (Figure 5). All white bass collected in 2007 were longer than 14 inches. White bass reproductive success and recruitment have been related to springtime reservoir inflows (DiCenzo and Duval 2002). Low reservoir inflow during drought years may have limited white bass production in this reservoir.

Largemouth bass: Florida largemouth bass were stocked in 2005 to take advantage of increased habitat resulting from water level rises beginning in 2003. The electrofishing catch rate of stock-length ($\geq$ 8 inches) largemouth bass was 21.2/h in 2006, representing a slight increase since 2004 (15.0/h) (Figure 6). Electrofishing catch rate of fish greater than 14 inches has remained less than 6.0/h since 1999. Size structure has improved slightly over recent years (PSD = 57, RSD-14 = 26). Growth of largemouth bass was good. Average age at 14 inches (13.0 – 14.9 inches) was 2.0 years (N = 8, range = 1 – 3 years). Body condition was adequate in 2006 (Mean W_r = 87.9, range = 75.7 – 102.7). Florida largemouth bass influence (Table 5) evidenced by percent Florida alleles (26.5) was present, but Florida genotype was 0% in 2006. Largemouth bass stocked in 2005 had not matured to influence young-of-the-year genetics by

the 2006 electrofishing survey.

White crappie: The trap net catch rate of white crappie was 51.8/nn in 2006, much higher than in 1999 (11.4/nn) (Figure 7). Average age at 10 inches (9.5 – 10.5 inches) was 1.0 year (N = 14, all were age-1) in 2006, indicating fast growth. Body condition was excellent with most W_r values near 100.

Fisheries management plan for Champion Creek Reservoir, Texas

Prepared – July 2007

ISSUE 1: Largemouth bass stocked in 2005 had not sexually matured to potentially influence young-fish genetics by 2006.

MANAGEMENT STRATEGY

1. Conduct electrofishing survey in 2008 to monitor genetic composition of age-0 largemouth bass.

ISSUE 2: Gizzard shad were abundant.

MANAGEMENT STRATEGY

1. Stock blue catfish at 100/acre in 2008 and 2009.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes standard electrofishing in 2008 and mandatory monitoring in 2010/2011 (Table 6). The 2008 electrofishing survey is necessary to collect largemouth bass genetic composition following stocking. Trap net surveys are only necessary every four years to monitor white crappie population. Gill net surveys are only necessary every four years at this point to monitor for changes in population parameters for blue catfish, channel catfish, flathead catfish, and white bass.

LITERATURE CITED

Anderson, R. O., and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-482 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques, 2nd edition. American Fisheries Society, Bethesda, Maryland.

Dennis, J., and B. Farquhar. 2000. Statewide freshwater fisheries monitoring and management program survey report for Champion Creek Reservoir, 1999. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin.

DiCenzo, V. J., M. J. Maceina, and M. R. Stimert. 1996. Relations between reservoir trophic state and gizzard shad population characteristics in Alabama reservoirs. North American Journal of Fisheries Management 16:888-895.

DiCenzo, V. J. and M. C. Duval. 2002. Importance of reservoir inflow in determining white bass year-class strength in three Virginia reservoirs. North American Journal of Fisheries Management 22(2):620-626.

Van Zee, B. 2003. Statewide freshwater fisheries monitoring and management program survey report for Champion Creek Reservoir, 2002. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin.

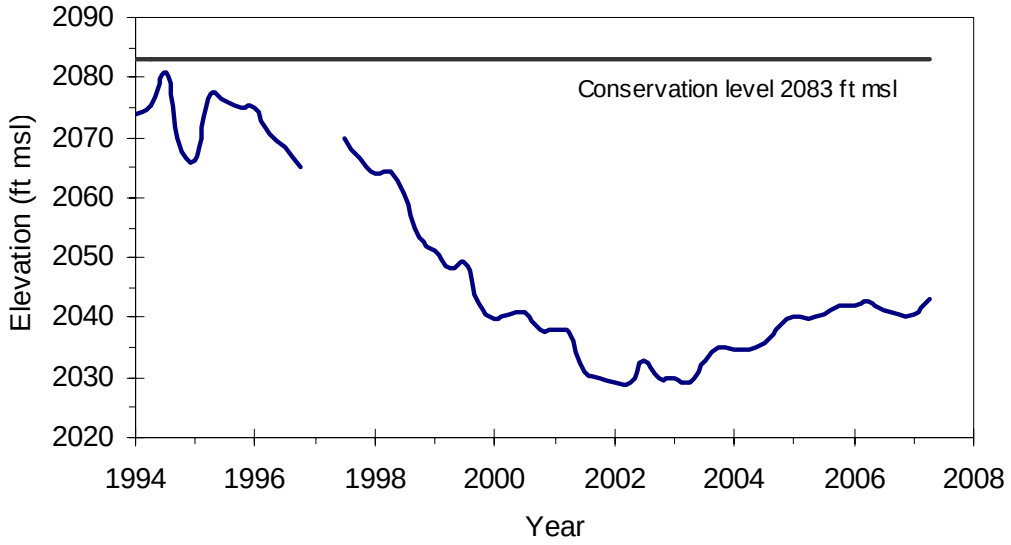


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for Champion Creek Reservoir, Texas, 1994 - 2007. Data for January through June 1997 were unavailable.

Table 1. Characteristics of Champion Creek Reservoir, Texas.

Characteristic	Description
Year constructed	1959
Controlling authority	Texas Electric Service Company
County	Mitchell
Reservoir type	Main stream
Shoreline Development Index	5.37
Conductivity	1,400 umhos/cm

Table 2. Harvest regulations for Champion Creek Reservoir, Texas.

Species	Bag Limit	Minimum-Maximum Length (inches)
Catfish: channel and blue catfish, their hybrids and subspecies	25 (in any combination)	12 - No Limit
Catfish, flathead	5	18 - No Limit
Bass, white	25	10 - No Limit
Bass: largemouth	5	14 - No Limit
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10 - No Limit

Table 3. Stocking history of Champion Creek Reservoir, Texas. Size categories are: FGL = 1-3 inches and UNK = unknown.

Year	Number	Size	Year	Number	Size
	Threadfin shad			Florida largemouth bass	
1982	2,000	UNK	1981	75,000	FGL
1984	8,500	UNK	1987	24,049	FGL
Species Total	10,500		1996	158,779	FGL
			1999	77,030	FGL
	Channel catfish		2005	35,770	FGL
1967	10,000	UNK	Species Total	370,628	
1968	35,000	UNK			
1969	26,400	UNK		Green sunfish X Redear	
1970	20,600	UNK	1980	17,326	UNK
1971	28,355	UNK			
1973	5,000	UNK		Coppernose X Green sunfish	
1974	15,000	UNK	1981	133,701	UNK
1980	48,780	UNK			
1981	71,239	UNK		Other sunfishes	
1987	164,799	FGL	1980	2,700	UNK
2005	35,702	FGL			
Species Total	460,875				
	Largemouth bass				
1970	39,000	UNK			
1971	5,194	UNK			
Species Total	44,194				

Table 4. Survey of littoral zone and physical habitat types, Champion Creek Reservoir, Texas, 2007. A linear shoreline distance (miles) was recorded for each habitat type found. Flooded dead and live terrestrial consisted primarily of saltcedar with a mixture of black willow.

Littoral habitat type	Shoreline Distance	
	Miles	Percent of total
Boulder	0.2	2.2
Flooded dead terrestrial	7.0	78.8
Flooded live terrestrial	0.2	2.2
Dead trees	0.2	2.2
Non-descript	1.0	11.3
Rock bluff	0.1	1.1
Rocky/gravel	0.2	2.2

Gizzard Shad

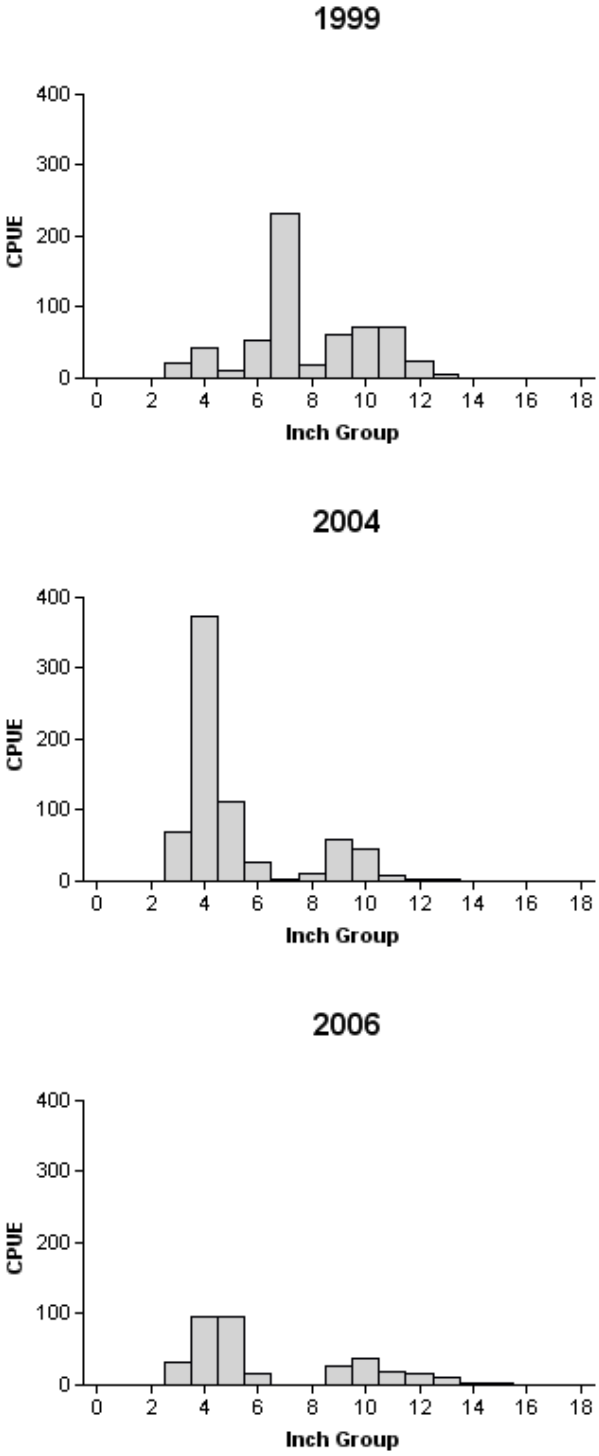


Figure 2. Number of gizzard shad caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Champion Creek Reservoir, Texas, 1999, 2004, and 2006.

Bluegill

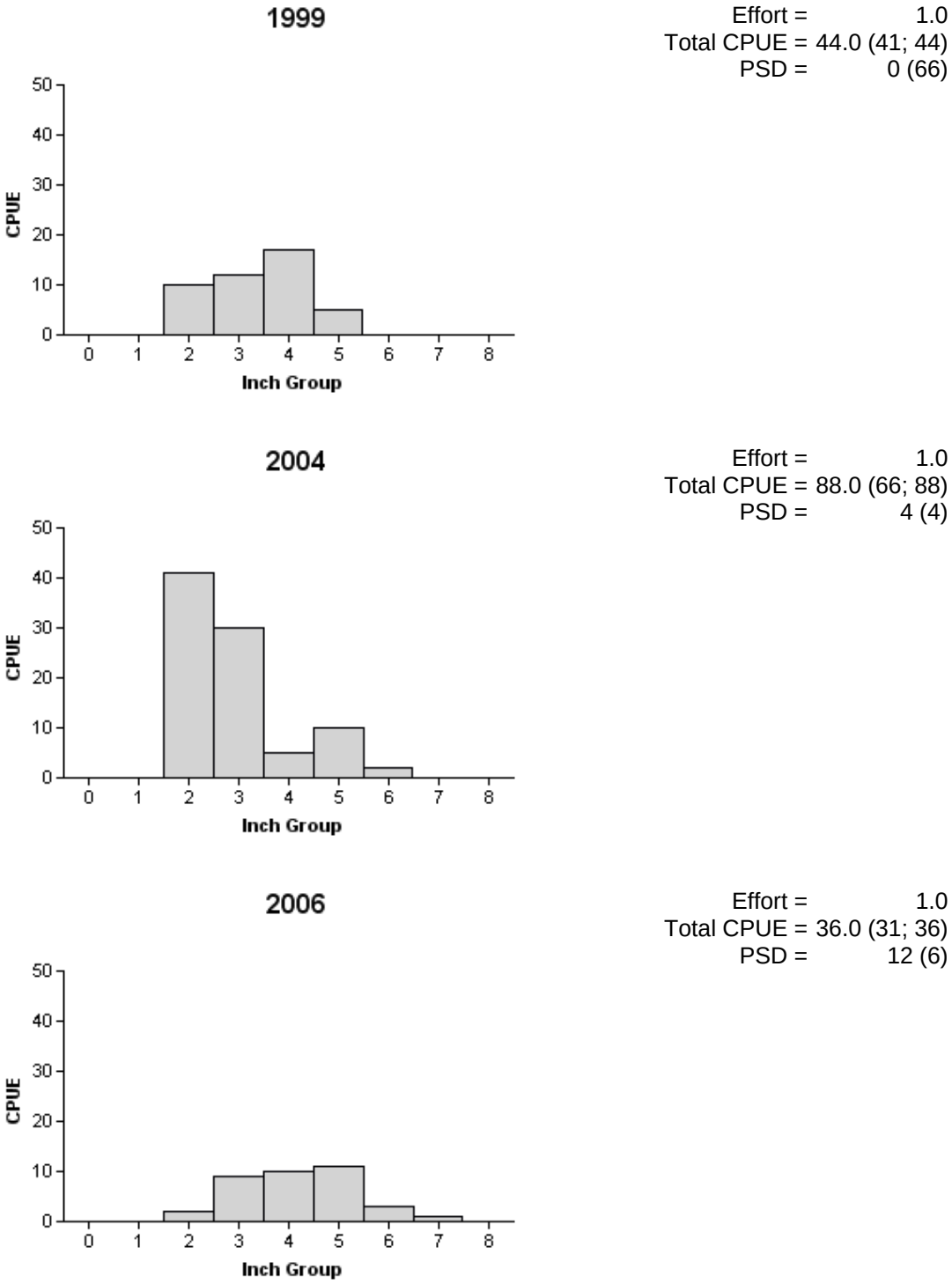


Figure 3. Number of bluegill caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Champion Creek Reservoir, Texas, 1999, 2004, and 2006.

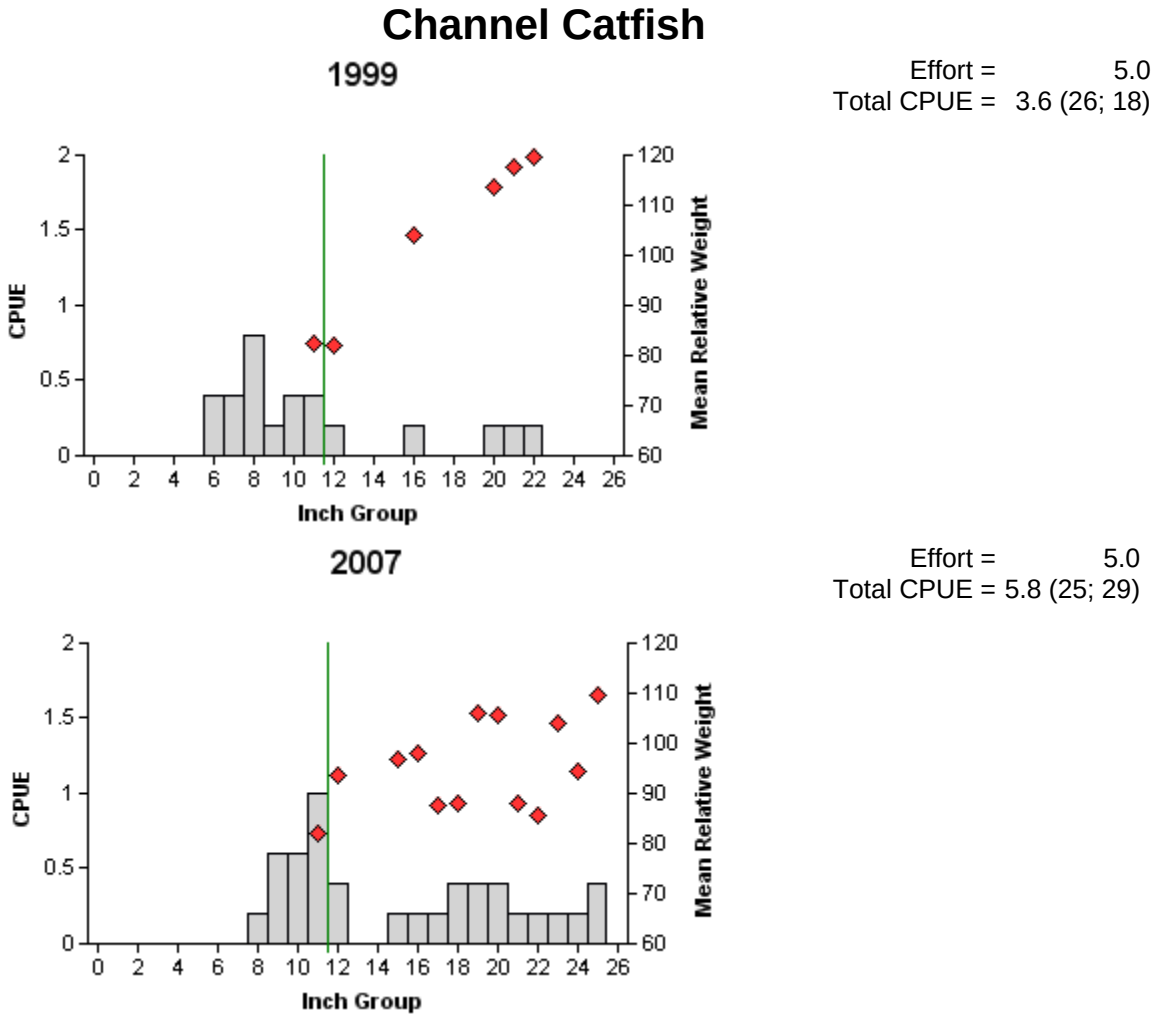


Figure 4. Number of channel catfish caught per net night (CPUE, bars) (RSE and N are in parentheses) and mean relative weight (diamonds) for spring gill net surveys, Champion Creek Reservoir, Texas, 1999 and 2007. Vertical line represents the minimum length limit.

White Bass

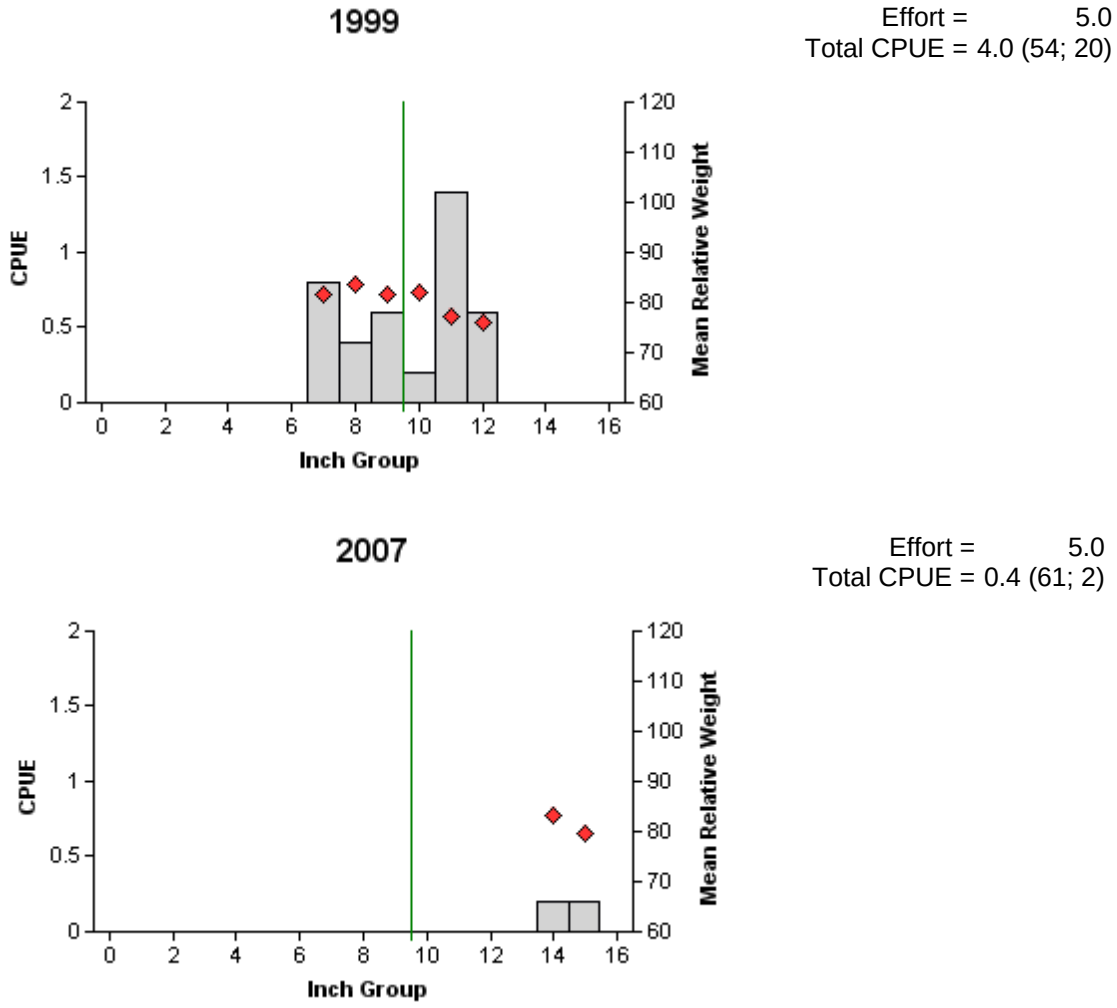
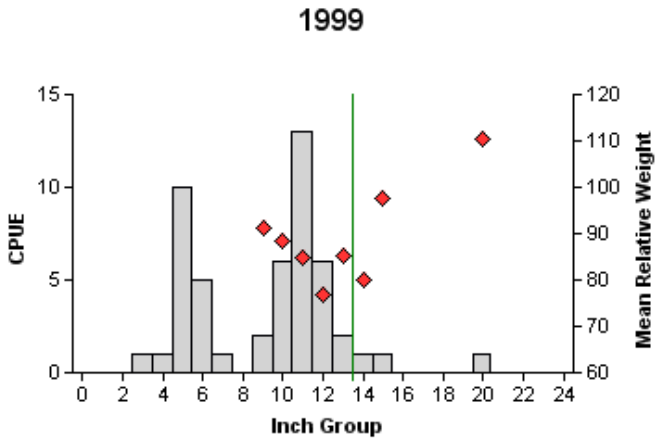
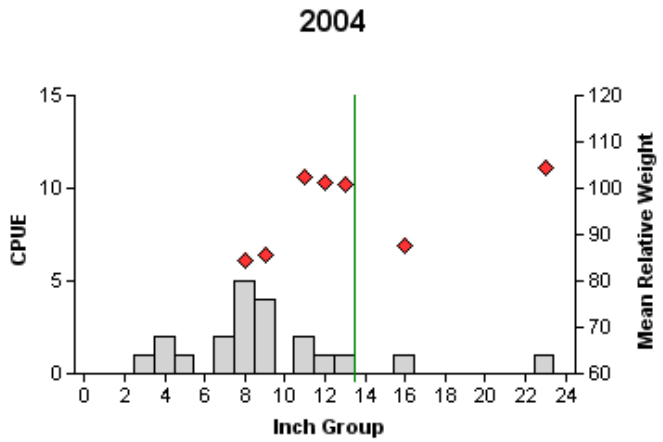


Figure 5. Number of white bass caught per net night (CPUE, bars) (RSE and N are in parentheses) and mean relative weight (diamonds) for spring gill net surveys, Champion Creek Reservoir, Texas, 1999 and 2007. Vertical line represents the minimum length limit.

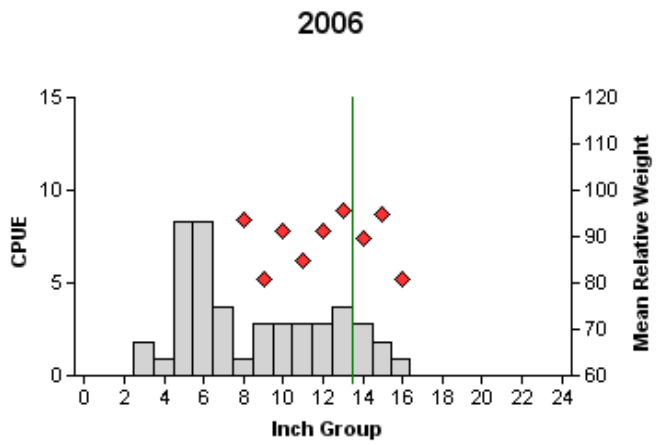
Largemouth Bass



Effort =	1.0
Total CPUE =	50.0 (38; 50)
Stock CPUE =	32.0 (44; 32)
CPUE-14 =	3.0 (52; 3)
PSD =	34 (6)
RSD-14 =	9 (5)



Effort =	1.0
Total CPUE =	21.0 (30; 21)
Stock CPUE =	15.0 (34; 15)
CPUE-14 =	2.0 (67; 2)
PSD =	27 (10)
RSD-14 =	13 (7)



Effort =	1.1
Total CPUE =	44.3 (31; 48)
Stock CPUE =	21.2 (34; 23)
CPUE-14 =	5.5 (40; 6)
PSD =	57 (15)
RSD-14 =	26 (9)

Figure 6. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Champion Creek Reservoir, Texas, 1999, 2004, and 2006. Vertical line represents the minimum length limit.

Table 5. Results of genetic analysis of largemouth bass collected by fall electrofishing, Champion Creek Reservoir, Texas, 1999 and 2006. FLMB = Florida largemouth bass, NLMB = Northern largemouth bass, FxN = first or higher generation hybrid between a FLMB and a NLMB. Microsatellite DNA analysis was used to determine largemouth bass genetic composition in 2006. Genetic analysis was done by electrophoresis in 1999.

		Genotype				
Year	Sample size	FLMB	FxN Hybrid	NLMB	% FLMB alleles	% pure FLMB
1999	31	4	23	4	51.6	12.9
2006	37	0	28	9	26.5	0.0

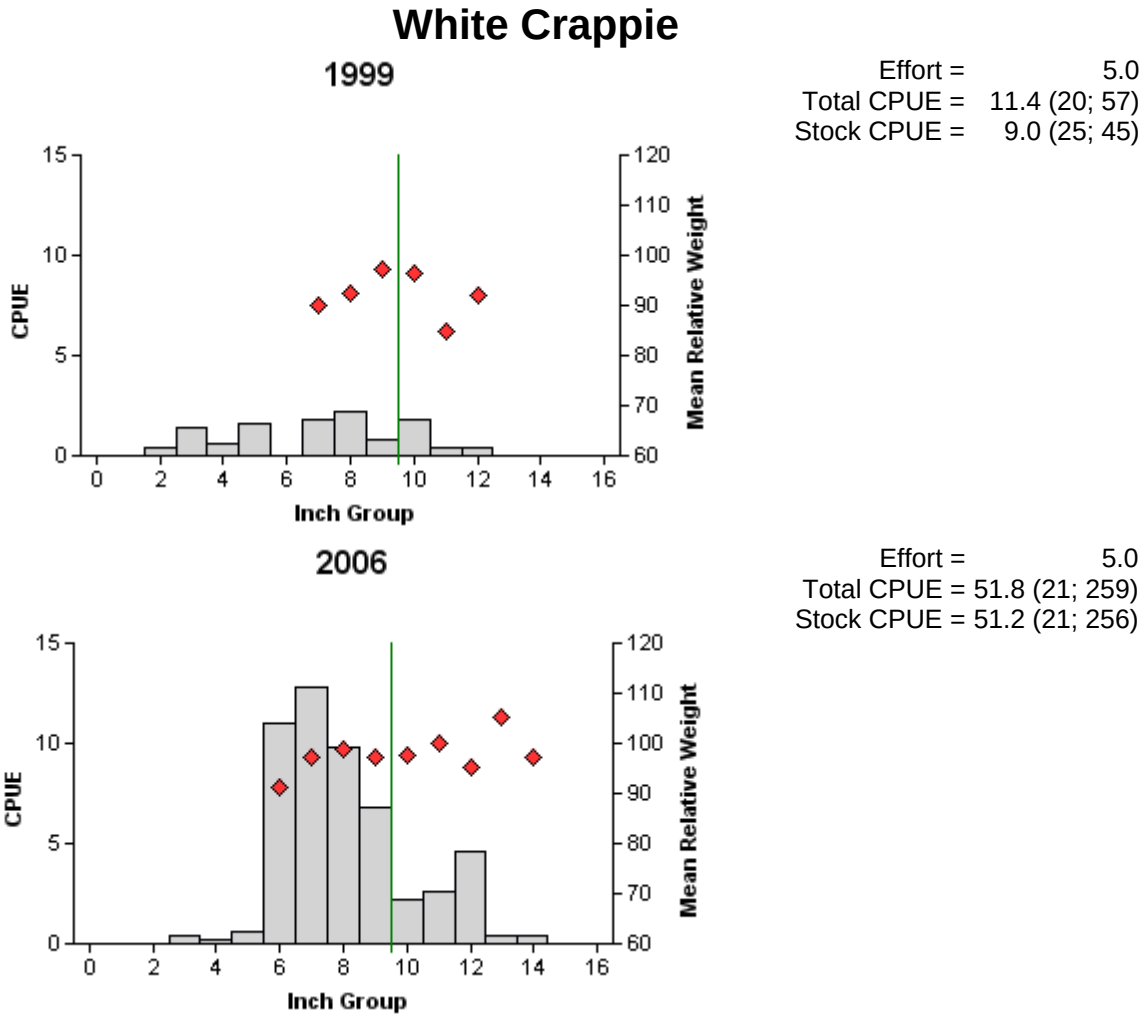


Figure 7. Number of white crappie caught per net night (CPUE, bars) (RSE and N are in parentheses) and mean relative weight (diamonds) for fall trap netting surveys, Champion Creek Reservoir, Texas, 1999 and 2006. Vertical line represents the minimum length limit.

Table 6. Proposed sampling schedule for Champion Creek Reservoir, Texas. Gill netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall. Standard survey denoted by S.

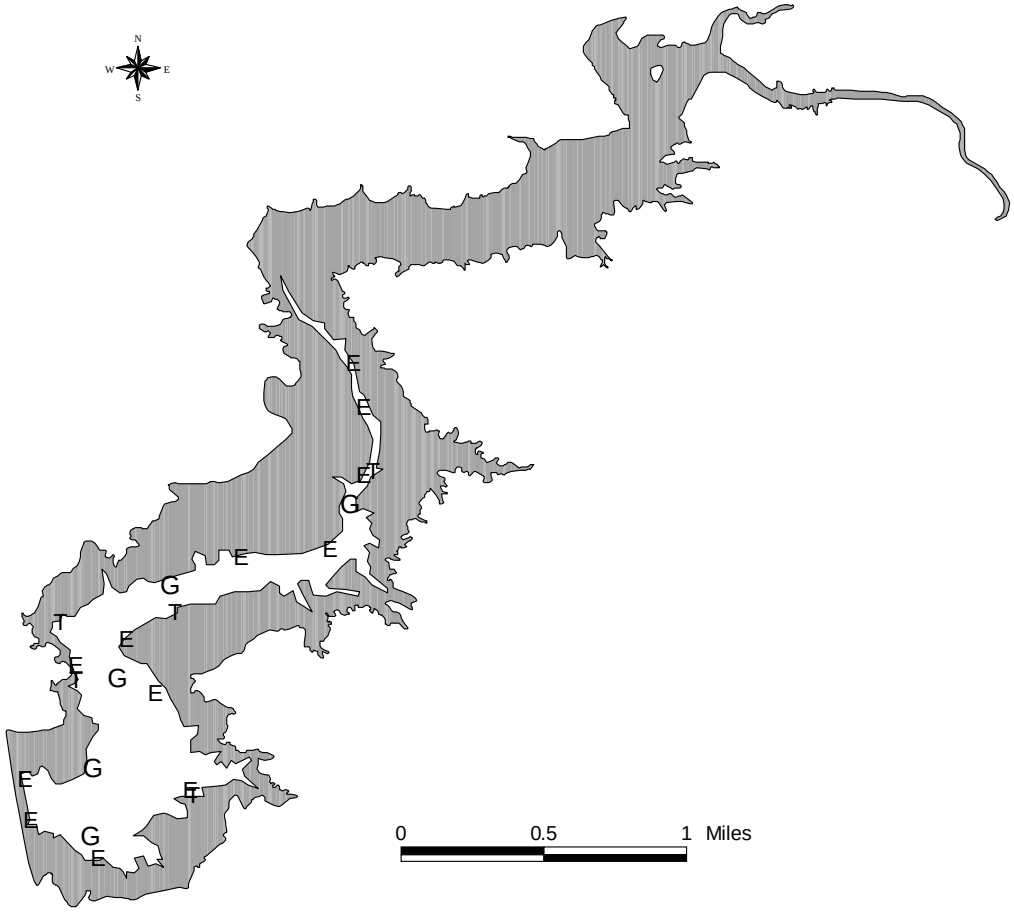
Survey Year	Electrofisher	Trap Net	Gill Net	Creel Survey	Report
Fall 2007-Spring 2008					
Fall 2008-Spring 2009	S				
Fall 2009-Spring 2010					
Fall 2010-Spring 2011	S	S	S		S

APPENDIX A

Number (N) and catch rate (CPUE) of all species collected from all standard gear types from Champion Creek Reservoir, Texas, 2006-2007.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad	164	32.8			365	365.0
Threadfin shad					46	46.0
Common carp	23	4.6				
River carpsucker	108	21.6				
Channel catfish	29	5.8				
Flathead catfish	5	1.0				
White bass	2	0.4			1	1.0
Green sunfish					1	1.0
Warmouth					4	4.0
Bluegill					36	36.0
Longear sunfish					5	5.0
Redear sunfish					4	4.0
Largemouth bass	4	0.8			48	44.3
White crappie	2	0.4	259	51.8	3	3.0

APPENDIX B



Location of sampling sites, Champion Creek Reservoir, Texas, 2006-2007. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively. Gray shaded areas represent reservoir surface area at approximately conservation pool elevation (2,083 ft msl). The white area represents reservoir pool surface area at approximately 2,040 ft msl. Water level was approximately 2,040 ft msl at time of sampling.